REMARKS

This amendment is submitted in Response to the outstanding Office Action dated May 12, 2010.

To summarize, Claims 2, 3 and 12 have been cancelled, and Claims 1, 5, 10 and 13 have been amended. In addition, the abstract and the specification have been amended to cure grammatical and idiomatic errors contained therein.

The abstract is objected to because the abstract contains more than 150 words. The abstract has been amended so that the abstract contains less than 150 words. Therefore, withdrawal of the objection to the abstract is respectfully requested.

Claims 1, 6 and 8-13 stand rejected under 35 U.S.C. §102(b) as being anticipated by Murata et al., US Patent No. 4 368 952. In addition, Claims 2-4 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Murata in view of Matsuura at al., US Patent No. 6 686 940. Claims 2 and 3 have been cancelled. However, Claim 1 as amended incorporates the subject matters of cancelled Claims 2 and 3, and thus this rejection will accordingly be addressed relative to Claim 1. Applicants respectfully traverse these grounds of rejection and urge that the presently claimed invention is patentably distinguishable over the prior art cited by the Examiner.

Claim 1 as amended is directed to a magnetic migration and reversal display panel comprising at least a dispersion liquid having a yield value obtained by dispersing, in a dispersion medium comprising a colorant, micro-magnets having magnetic poles that differ in color and that differ in color from the dispersion medium as well, and support members that retain the dispersion liquid, wherein each of the micro-magnets comprises two or more kinds of magnetic materials with different coercive forces including a first magnetic material consisting of a high coercive force material having a coercive force of from 65.0 kA/m to 600 kA/m and a second magnetic material consisting of a low magnetic coercive force material

having a coercive force of from 0.8 kA/m to 65.0 kA/m. (emphasis added)

In a magnetic display system, two types of magnetic display panels - a magnetic migration display forming a display by the migration of magnetic particles and a magnetic reversal display panel forming a display by reversing magnetic particles - are known. However, these conventional magnetic display panels have been limited in use or have difficulties in writing images in plural colors or erasing written images.

The present invention provides a magnetic migration and reversal display panel which enables a display in two colors in addition to the background, i.e., a three color display, and provides a wide range of industrial applicability. Using the display panel of the present invention, a three color display can be magnetically obtained: i) by forming a writing by causing an external magnet for writing to act on the micro-magnets for causing migration with or without reversal of the micro-magnets, thereby causing the color tone of the specified surface of the micro-magnets to be displayed, and then ii) by changing the color tone of the writing by reversing the micro-magnets forming the writing by causing a magnetic field of the magnetic pole opposite to the magnetic pole of the external magnet for writing to act from the same surface side within a range so that other micro-magnets which do not form the writing do not migrate. The resulting display can be erased by using a magnet for erasing from the back surface of the panel to attract the micro-magnets to the back surface side.

When the micro-magnets are used in a reversal type magnetic display panel, it is sufficient to consider only the reversal performance of the micro-magnets when selecting the magnetic material used therein. However, since the magnetic display panel of the present invention produces images in three colors by migration and reversal of micro-magnets, the balance between the magnetic characteristics for contributing to migration and the magnetic characteristics for contributing to reversal becomes a key feature when preparing the micro-

magnets used in the magnetic migration and reversal display panel. Thus, the micro-magnets used in the present inventions comprise magnetic materials with different coercive forces. It is thereby possible to broaden the range of magnetic characteristics, such as the apparent coercive force of the micro-magnets, and to obtain micro-magnets that fulfill both roles of contributing to migration characteristics and contributing to reversal characteristics. If either the first magnetic material or the second magnetic material departs from the specified ranges, it is difficult to harmonize both the migration performance and the reversal performance of the micro-magnets, and thus various problems occur, such as ill-defined display, aggregation of the micro-magnets, damage of the magnetic poles of the micro-magnets, difficulties in manufacturing and design, etc.

In contrast, Murata discloses a magnetic reversal type display panel comprising: two opposed surface plates and a liquid dispersion sealed in the space between said surface plates, said liquid dispersion comprising fine reversible magnetic display grains having magnetic poles of opposite signs tinged with different colors, a dispersion medium and a fine grain thickener, wherein said fine reversible magnetic display grains have a residual magnetic moment within the range of from 0.2 to 10 emu/g and a coercive force of not less than 500 oersteds, and said liquid dispersion has a yield value of not less than 5.0 dynes/cm^2.

However, Murata does not disclose a magnetic migration and reversal display panel. The display panel of Murata is a magnetic reversal type and produces a display by reversing fine magnetic display grains by means of a magnetic writing instrument. Thus, the reversal display panel of Murata is different from the magnetic migration and reversal display panel of the present invention which produces a display by migration and reversal of the micro-magnets, and Murata does not teach the balance between the reversal characteristics and the migration characteristics in the micro-magnets, which is a

key feature to the magnetic migration and reversal display panel as mentioned above.

Also, Murata does not teach the use of micro-magnets, each comprising a high coercive force material with a coercive force of from 65.0 kA/m to 600 kA/m and a low magnetic coercive force material with a coercive force of from 0.8 kA/m to 65.0 kA/m in order to achieve a well-balanced reversal and migration characteristics required for the magnetic migration and reversal display panel. If good balance is not obtained between the migration performance and the reversal performance, aggregation of the micro-magnets, damage of the magnetic poles of the micro-magnets and/or an ill-defined display occurs.

Although Murata requires that the coercive force of the magnetic grains be exceed 500 oersteds, it does not disclose the use of magnetic materials with different coercive forces in each reversible magnetic grain and shows no specific example using plural different magnetic materials with different coercive forces.

The Examiner admits Murata does not teach that each of the micro-magnets comprises two or more kinds of magnetic materials with different coercive forces, and cites Matsuura to cure the deficiencies.

Matsuura discloses a dry developer used for forming a visible image from an electrostatic latent image by an electrophotographic method and comprising at least two kinds of frictionally chargeable dry developing particles having different chargeable polarities and different optical reflection densities, wherein at least one kind of the developing particles may be magnetic developing particles having a coercive force of 50 oersteds to 250 oersteds.

In a specific embodiment using magnetic developing particles, Matsuura discloses a dry developer DL including white non-magnetic developing particles WP and black magnetic developing particles BP, which are mutually and frictionally charged. The black magnetic developing particles have the

magnetic coercive force shown in Table 3 of this reference. However, Matsuura does not disclose that these two different kinds of developing particles WP and BP are both magnetic, and does not teach the use of magnetic materials, each including plural kinds of magnetic materials with different magnetic coercive forces, i.e. a high magnetic coercive force material and a low magnetic coercive force material in the same magnetic particle.

Matsuura's dry developing medium is used in an image displaying system different from a magnetic displaying system and produces a visible image by developing an electrostatic latent image with the developing particles in the medium having a polarity (plus or minus) opposite to that of the latent image. Therefore, Matsuura's dry developer is used in the visible image formation process from an electrostatic latent image, such as an electrophotographic method, but not as a magnetic displaying process.

Further, Matsuura's display medium using a developer rather than a liquid is clearly distinguishable over Murata's magnetic display using a liquid for dispersing the magnetic display grains. As described in column 8, lines 56-67, Matsuura's developer avoids the use of a liquid and thereby eliminates the problems caused due to the presence of a liquid.

Murata's display panel and Matsuura's reversible image display medium are used in entirely different display systems and displaying process, and thus there would be no motivation to combine these two prior art references. Even if they were combined, the combination does not teach the present invention.

In order to cure the deficiency of Murata, the Examiner states that Matsuura discloses the micro-magnets comprising at least two or more kinds of magnetic materials (column 19, lines 4-6) including a first magnetic material comprising a high coercive force material (column 19, lines 13-15) and a second magnetic material comprising a low magnetic coercive

force material (column 19, lines 5-10). The cited portion of Matsuura teaches that the magnetic developing particles used in the liquid-free dry developer must have a proper magnetic coercive force for achieving smooth movement of the developer and good images. As mentioned above, there is no disclosure or suggestion about the micro-magnets each comprising two or more magnetic materials with different magnetic coercive forces required in the present invention.

Further, as the Examiner admits in the Office Action, Murata discloses the use of a magnetic material with a coercive force of 221 kA/m, and Matsuura discloses the use of two kinds of magnetic materials, i.e., the first one with a coercive force of 4-20 kA/m and the second one with a coercive force of 0 kA/m. However, there is no motivation for combination of the magnetic coercive forces in Murata and Matsuura. Murata expressly requires that the magnetic display grains have a coercive force of not less than 500 oersteds because a coercive force of less than 500 oersteds cannot form a clear display (column 4, lines 9-22), whereas Matsuura requires that magnetic developing particles have a coercive force of 50 oersteds to 250 oersteds for achieving good images (column 19, lines 29-39). Since the references teach that magnetic materials with magnetic coercive forces outside their specified ranges should not be used, there would be no motivation to combine the magnetic coercive force for the magnetic reversible display grains dispersed in a liquid disclosed in Murata and the magnetic coercive force for the magnetic particle in the liquid-free dry developer disclosed in Matsuura in order to achieve the micro-magnets used in the claimed magnetic migration and reversal display panel which is used in a different displaying system from Murata and Matsuura.

Moreover, neither Murata nor Matsuura discloses or suggests the use of plural magnetic materials with different coercive forces in each of the magnetic grains.

Objective evidence of the unobviousness of the present invention is shown by the Examples and Comparative Examples in the present specification. The unexpected effects of the present invention are demonstrated by the test results of a number of examples using the specified micro-magnets, each of which comprises both the high coercive force material and the low coercive force material. The test results of the Comparative Examples show that using micro-magnets comprising either a high coercive force magnetic material or a low coercive force magnetic material cannot establish well-balanced migration and reversal performance and results in aggregation of the micro-magnets, damage of the magnetic poles of the micro-magnets or ill-defined display.

Accordingly, Claim 1 is believed to be patentably distinguishable over Murata and Matsuura, alone or in combination with one another.

Claim 12 has been cancelled. Claims 4, 6, 8-11 and 13 depend upon what is believed to be an allowable Claim 1, and thus are believed allowable therewith.

Claims 5 and 7 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Murata in view of Hakata, US Patent No. 6 017 667. Claims 5 and 7 depend upon what is believed to be an allowable Claim 1, are believed allowable therewith, and include additional features which further distinguish over Murata and Hakata. For example, Claim 5 recites, "the first magnetic material is hexagonal magnetoplumbite-type ferrite, and the second magnetic material is at least one magnetic materials selected from the group consisting of magnetite, maghemite, cobalt-deposited magnetite, and cobalt-deposited maghemite." Claim 7 recites, "the residual magnetization per unit mass of the micro-magnets is 1 to 35 $A \cdot m^2/kg$, and the saturation magnetization per unit mass of the micro-magnets is 1 to 100 $A \cdot m^2/kg$."

Hakata discloses spherical-like composite particles used as an electrophotographic magnetic carrier in a developing material for developing an electrostatic latent image into a

visible image and belongs to the technical field of Matsuura. Therefore, Hakata neither discloses nor suggests the magnetic migration and reversal display panel of the present invention used in a magnetic display system.

In view of the above, the instant application is believed to be in condition for allowance, and action toward that end is respectfully requested.

Respectfully submitted,

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Encl: Replacement Abstract
Clean Substitute Specification
Marked-Up Substitute Specification
Postal Card

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